Southwest U.S. undergoes megadroughts lasting hundreds of years

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The mysteries of climate change became a little less mysterious thanks to work by Los Alamos National Laboratory researchers digging around in the nearby Valles Caldera National Preserve.

Working with an international research team, the scientists unearthed a 260-foot-long sediment core that peered back in climatological time to the world as it existed between 360,000 and 550,000 years ago.

Latest megadrought included historic Dust Bowl

According to their findings, the Southwestern region of the United States apparently undergoes "megadroughts"—warmer, drier periods lasting hundreds of years or more. These megadroughts appear in cycles, with the most recent one comprising a present-day period that included the historic Dust Bowl.

If their research is correct, people in the Southwest could be in for cooler, wetter weather in the future, unless the cycle is affected by increased concentrations of greenhouse gasses.

Core samples reveal temperature and aridity of years past

Within the core samples, researchers look for bits of pollen and plant matter, major elements, trace elements, isotope ratios, and other measurables that can be combined to reveal temperature and aridity.

With this information, Los Alamos National Laboratory scientists and collaborators were able to reconstruct an accurate climate history of the Pleistocene interglacials in the American Southwest. They found that as the interglacial periods progressed, temperatures warmed and brought about wet conditions and plentiful plant life.

But continued warming sometimes led to much drier conditions, accompanied by a major decrease in plant life. Such "megadrought" periods occurred at least once in each interglacial, and lasted for hundreds of years—sometimes thousands.

Temperatures, pollen count higher in megadrought

The megadroughts in the study period involved a consistent set of environmental changes. Average temperatures were as high or higher than they are today, and as a result, prevailing mid-latitude westerly wind patterns shifted northwards.

This led to substantially reduced precipitation in the Southwest. As a consequence of this increase in aridity, there was a shift in the region’s ecology.

Pollens trapped in the sediment core revealed that during the megadroughts, spruce and fir trees diminished, as did grass-like plants called sedges. Even some of the most drought-tolerant grasses showed evidence of decline. During the same time period, pollen counts from juniper and oak increased.

Southwest not currently in a megadrought

Interestingly, some of these same megadrought conditions—higher than average temperatures, aridity, and a juniper and scrub oak ecology—characterize much of the American Southwest today as well.

But the Southwest is not presently in a prolonged megadrought. Although the symptoms are similar, they differ in severity. Megadroughts probably resembled the Dust Bowl of the 1930s, only more arid, and lasting much longer.